

Beam is in Equilibrium

Sum of moments about point 1

$\sum M_1 = 0$

Sum of moments about point 2

$\sum M_2 = 0$

$\sum M_3 = 0$

$\sum M_4 = 0$

$R_1 = 10$

$R_2 = 20$

$R_3 = 10$

$R_4 = 10$

$R_5 = 10$

$R_6 = 10$

$R_7 = 10$

$R_8 = 10$

$R_9 = 10$

$R_{10} = 10$

$R_{11} = 10$

$R_{12} = 10$

$R_{13} = 10$

$R_{14} = 10$

$R_{15} = 10$

$R_{16} = 10$

$R_{17} = 10$

$R_{18} = 10$

$R_{19} = 10$

$R_{20} = 10$

$R_{21} = 10$

$R_{22} = 10$

$R_{23} = 10$

$R_{24} = 10$

$R_{25} = 10$

$R_{26} = 10$

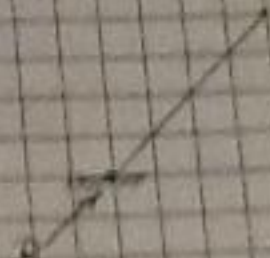
$R_{27} = 10$

$R_{28} = 10$

$R_{29} = 10$

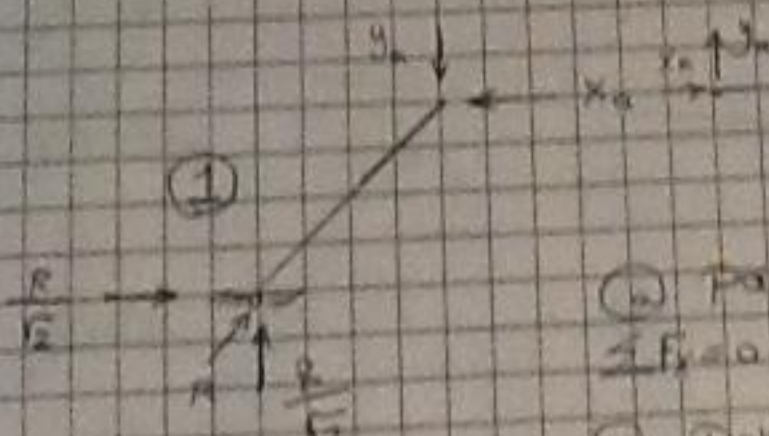
$R_{30} = 10$

Get IL SF



normal only

$R = \sqrt{2} y_0$



Part 1

$\sum F_x = 0$

Part 2

$\sum F_y = 0$

$x_0 = 0$

$y_0 = 0$

$R = \sqrt{2} y_0$

$R = \sqrt{2} y_0$

$R = \sqrt{2} y_0$

$R = \sqrt{2} y_0$

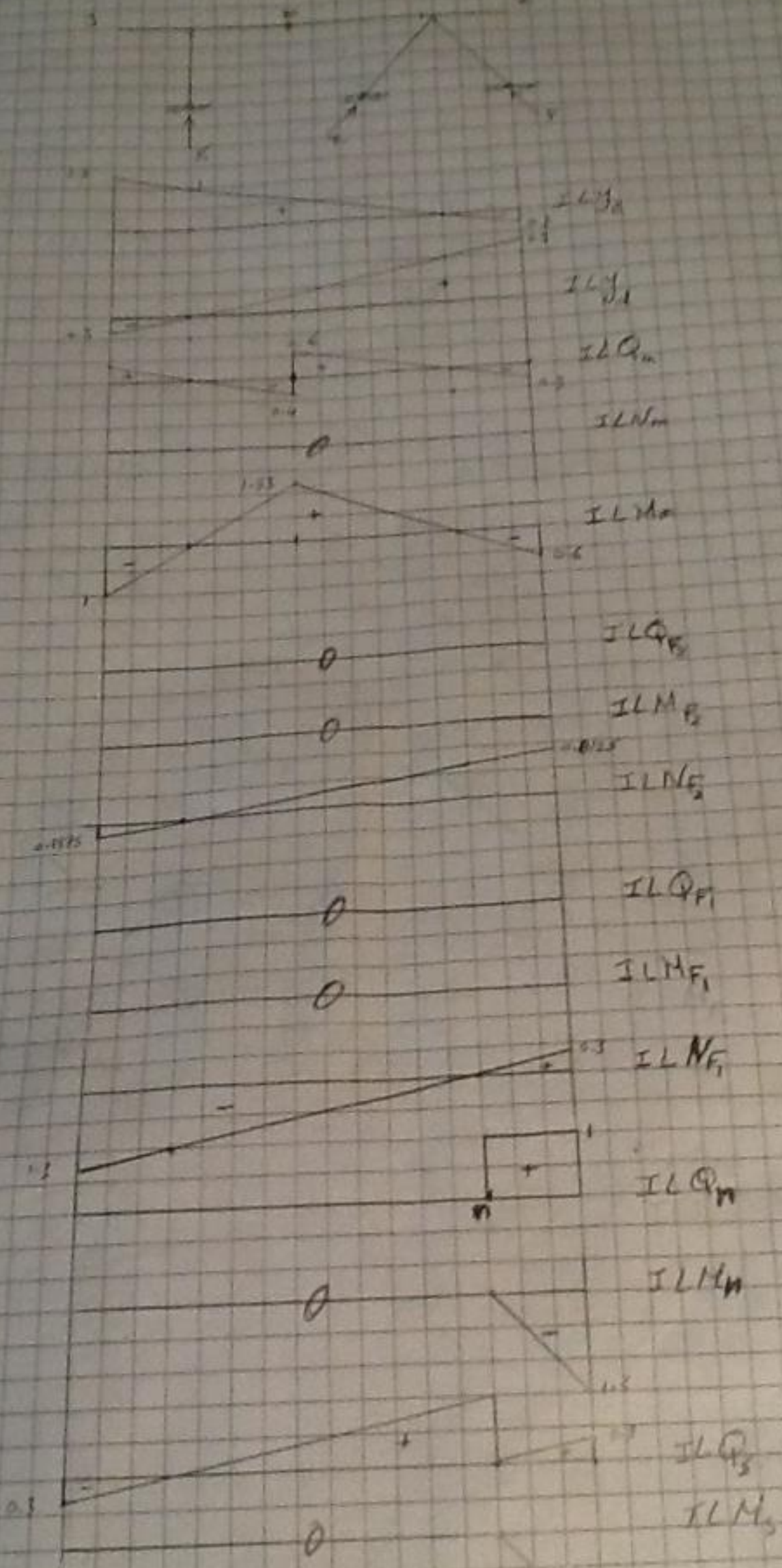
$R = \sqrt{2} y_0$

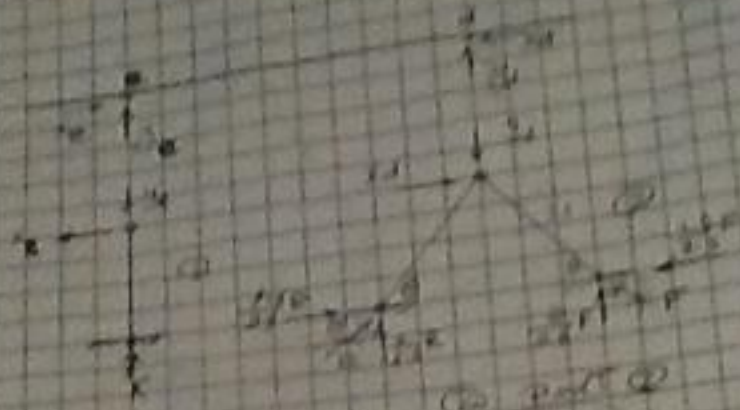
$R = \sqrt{2} y_0$

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$R = \sqrt{2} y_0$





$$\frac{2.5 y_d}{2.5}$$

$$\frac{1.5 y_d}{2.5}$$

$$\sum F_y = 0$$

$$R = 3 y_d$$

$$\sum F_x = 0$$

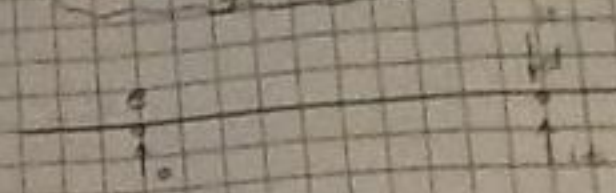
$$R = 3 y_d$$

$$\sum F_y = 0$$

$$R = F$$

$$\sum F_x = 0$$

$$R = F = \frac{2.5 y_d}{4} = 0.625 y_d$$



$$Q_m = -y_d$$

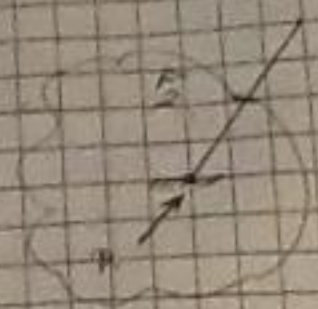
$$N_m = 0$$

$$M_m = 3 y_d$$

$$Q_m = y_d$$

$$N_m = 0$$

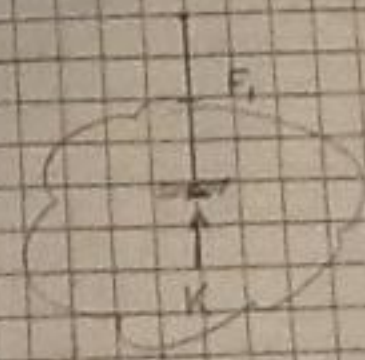
$$M_m = 2 y_d$$



Get IF for sec F_2

we will Get normal force

$$N_{F_2} = -0.625 y_d$$



Get IF for sec F_1

we will Get normal force

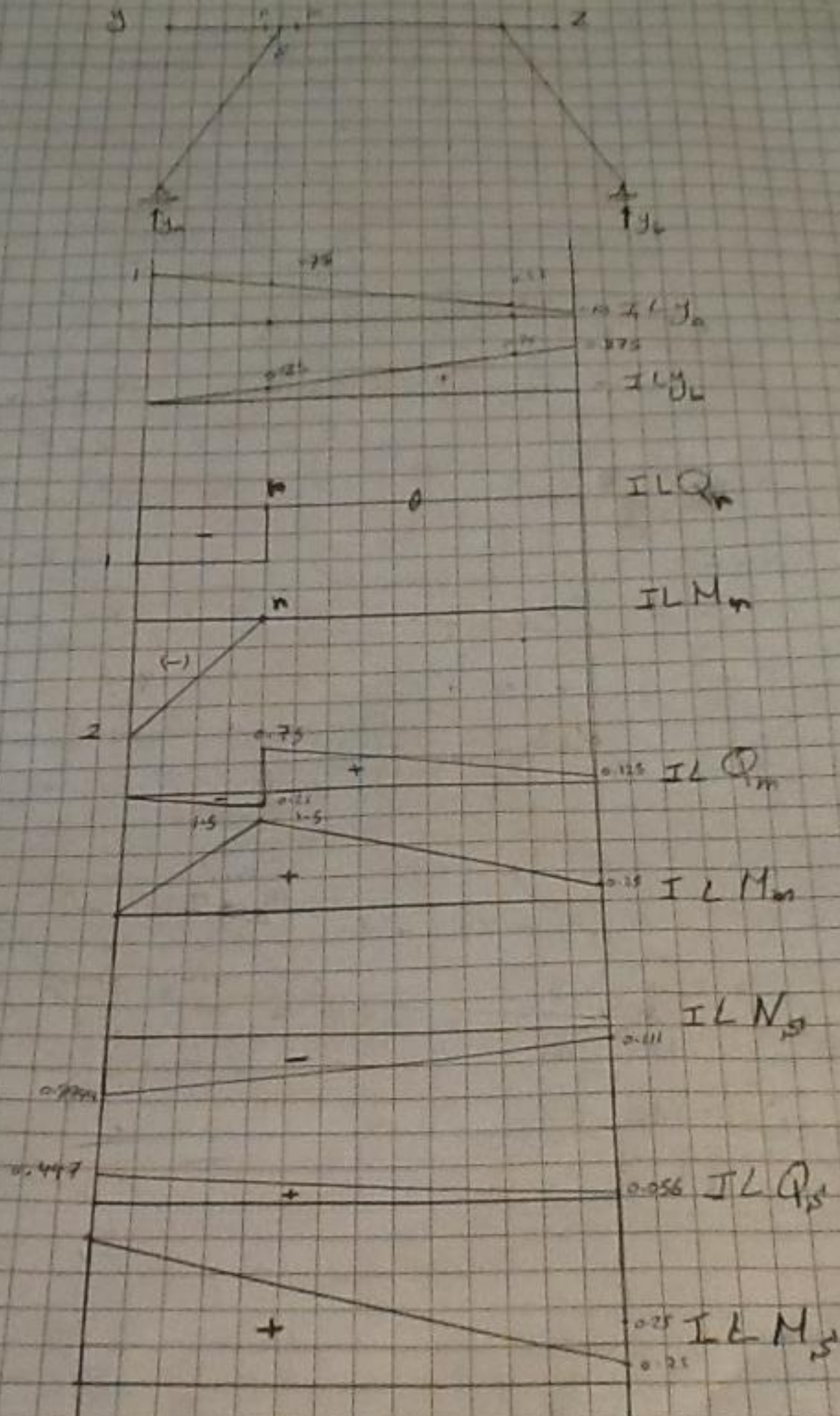
$$N_{F_1} = -K = -\frac{y_d}{4}$$

Sec n Cantilever

Sec S Cantilever

$$Q_y = y_d$$

$$Q_y = y_d$$



③

$\sum M_D = 0$
 $-y_D \times 8 + 1 \times 2 = 0$
 $y_D = \frac{1}{4} = 0.25$

$\sum M_D = 0$
 $-y_D \times 2 + 1 \times 6 = 0$
 $y_D = \frac{6}{2} = 3$

Sec n \Rightarrow Sec on Cantilever

Eq on
Sec m \Rightarrow Cantilever

16 (y \rightarrow m) R.H.S

$Q_m = -\frac{y}{6}$

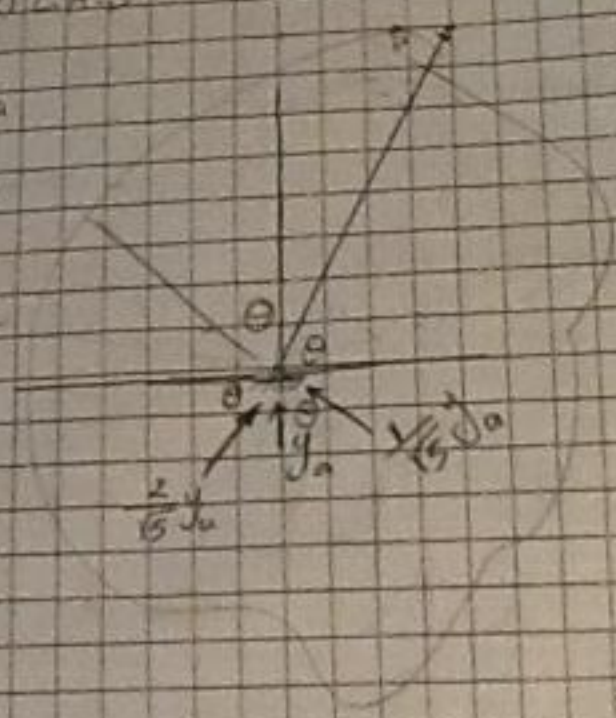
$M_m = 0 \frac{y}{6}$

17 (x \rightarrow z) L.H.S

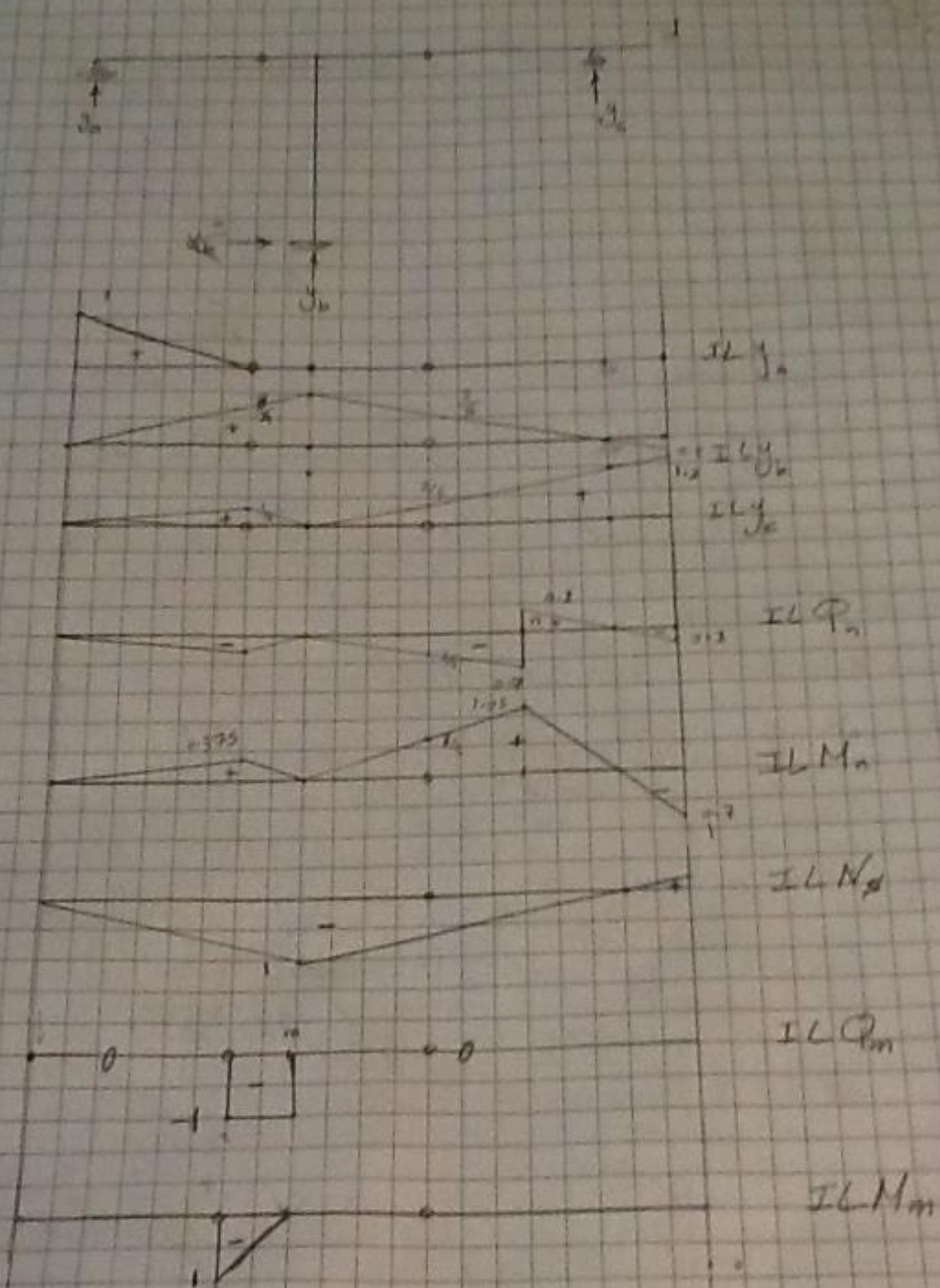
$Q_m = \frac{y}{6}$

$M_m = 2 \frac{y}{6}$

Sec 15



$\cos \theta = \frac{2}{\sqrt{5}}$
 $\sin \theta = \frac{2}{\sqrt{5}}$



$\sum M_{(a \rightarrow b)} = 0 \Rightarrow y_b + 4 + 1.5 - 3y_a = 0 \Rightarrow 4y_a = 5.5 \Rightarrow y_a = 1.375$
 $\sum F_y = 0 \Rightarrow y_a = y_b$
 $\sum M_{(a \rightarrow d)} = 0 \Rightarrow y_b + 1 + 3 - y_a + 6 = 0 \Rightarrow 2 + 4y_b = 0 \Rightarrow y_b = -0.5$

$\sum M_{(c \rightarrow d)} = 0 \Rightarrow y_c + 3 + 1.5 + y_b = 0$
 $\Rightarrow 9y_c + 5y_b = 6$ ①
 $\sum M_{(c \rightarrow b)} = 0$
 $\Rightarrow y_c + 3 - 1.5 + y_a = 0$
 $\Rightarrow 2y_c + 4.5 = 0$ ②
 from ① & ② $y_a = \frac{1}{4}$ $y_b = \frac{3}{4}$
 $\sum F_y = 0 \Rightarrow y_c = 0$

Sec n

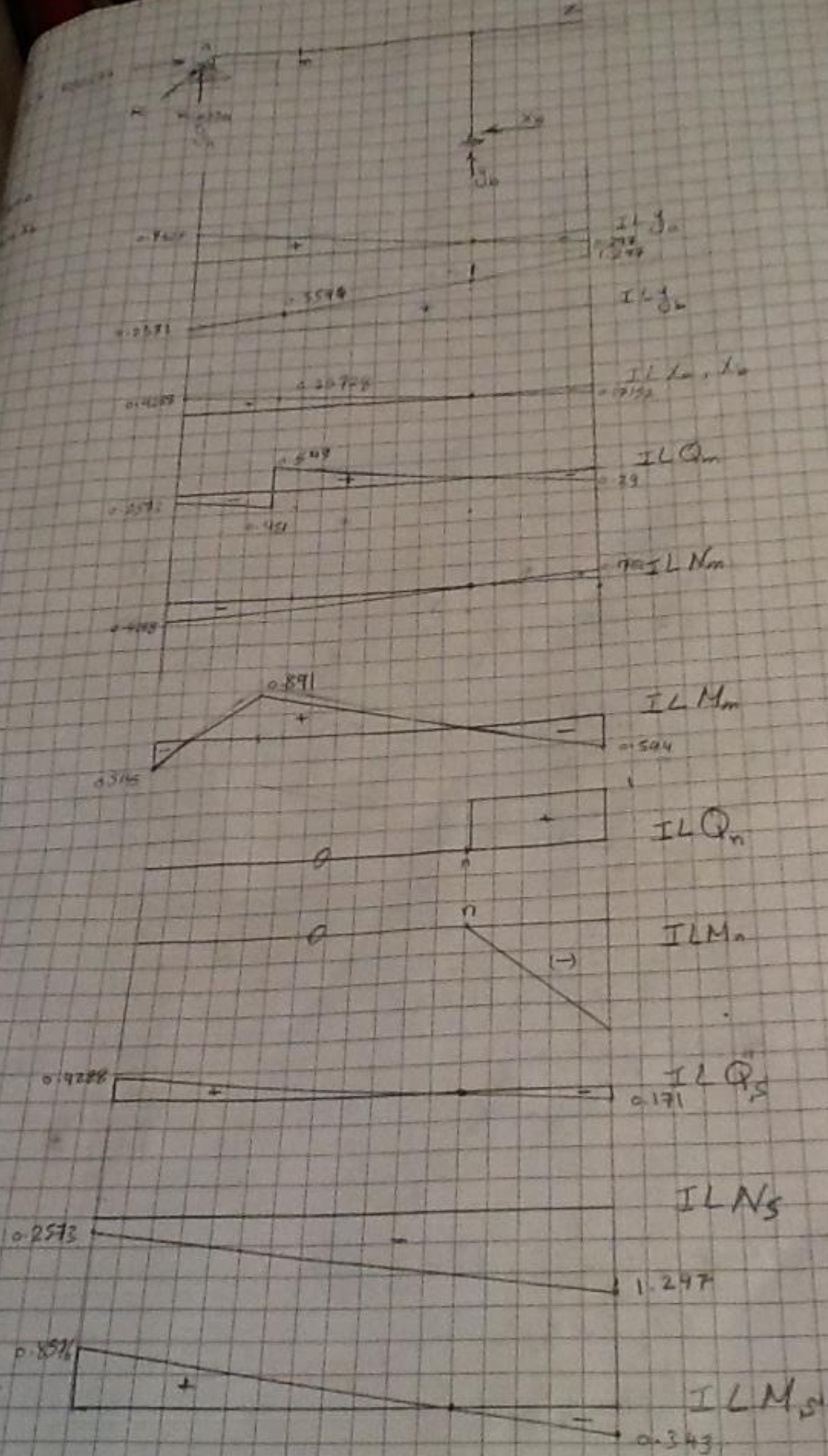
It (a \rightarrow n) R.H.S
 $Q_n = -\frac{y}{10}$
 $M_n = 1.5y_c$

Sec s

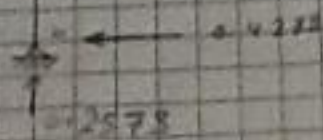
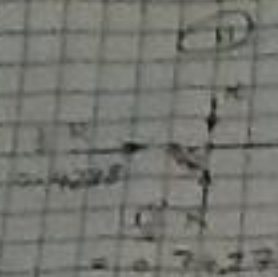
It (n \rightarrow d) L.H.S
 $Q_n = y_a + y_b$
 $M_n = 1.5y_c + 9y_a$
 Normal only!
 $N_s = -y_b$

Sec m

It (a \rightarrow m) on left
 $Q_m = \frac{y}{10} - \frac{y}{10}$
 $M_m = y_c + 4 = 1.2$
 It (m \rightarrow d) L.H.S on
 $Q_m = +y_c$
 $M_m = +4y_c$



$$10.5 - \frac{1}{2} R \cdot 5 - \frac{1}{2} R \cdot 4 = 0$$



$$\sum M_{(a)} = 0$$

$$10.5 \cdot 9 + \frac{1}{2} R \cdot 5 = 0$$

$$R = 0.857$$

Sec m

It (a) Right

$$Q_m = -y_b$$

$$N_m = -x_b$$

$$M_m = 3y_b - 3x_b$$

It (m) L.H.S

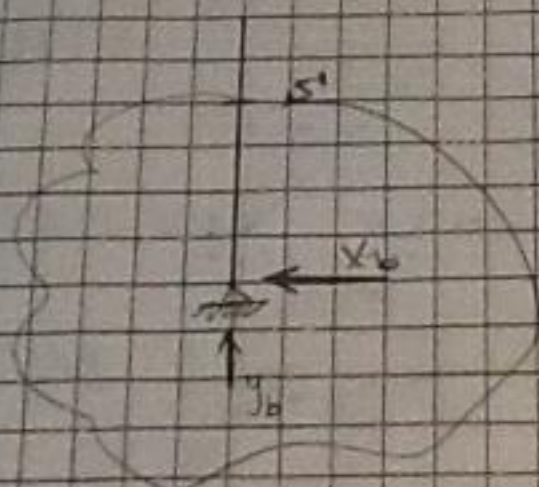
$$Q_m = y_a$$

$$N_m = -x_a$$

$$M_m = 2y_a$$

Sec n Cant lever

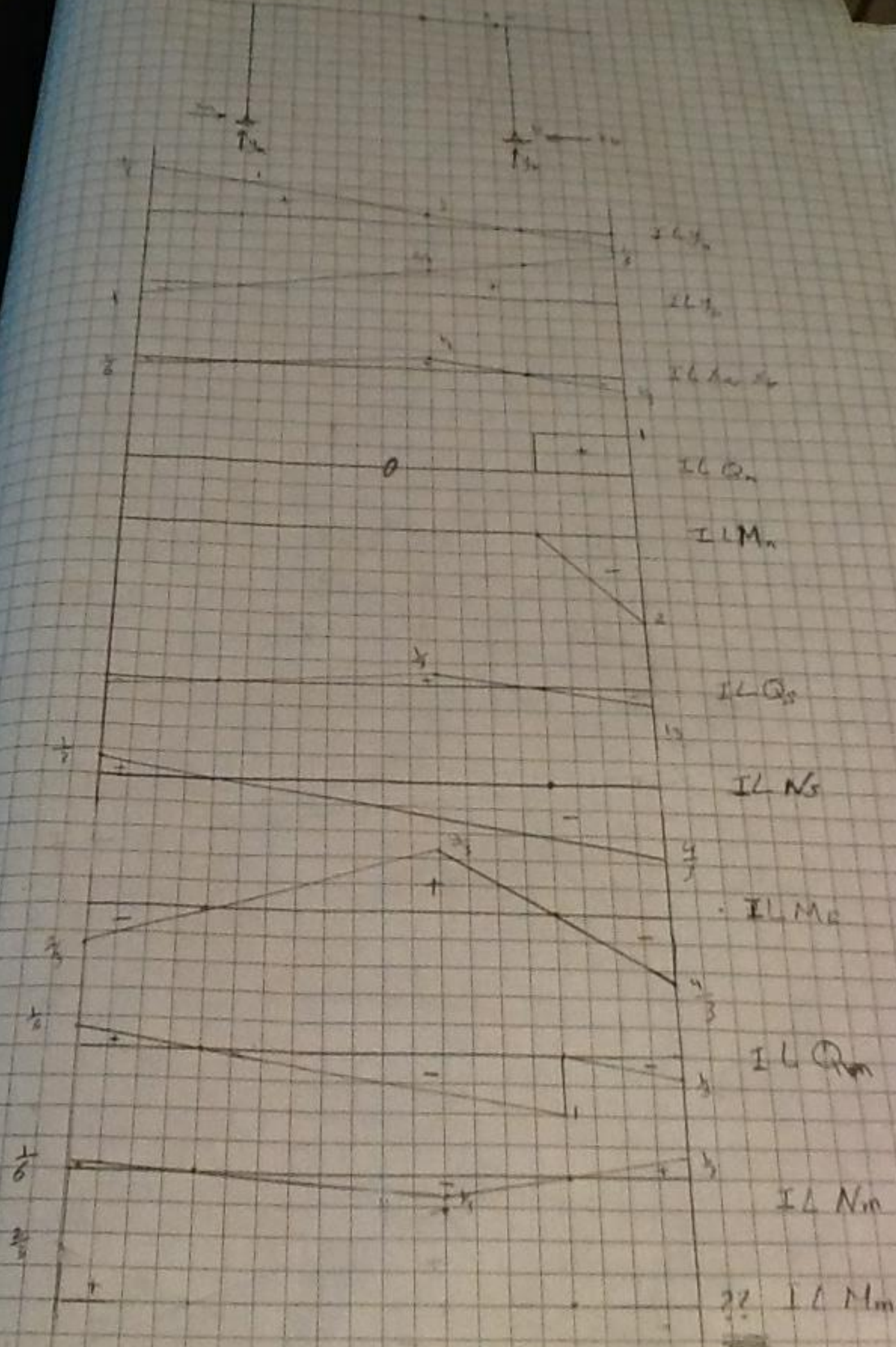
Sec S



$$Q_s = +x_b$$

$$N_s = -y_b$$

$$M_s = 2x_b$$





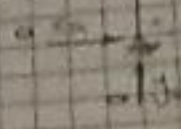
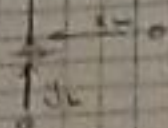
$$\sum M_{\text{at } 10} = 0$$

$$\Rightarrow 1 \times 10 = Y_b \times 6$$

$$\Rightarrow Y_b = \frac{10}{3}$$

$$\sum F_y = 0$$

$$\Rightarrow Y_b = \frac{10}{3}$$



$$\sum M_{\text{at } 10} = 0$$

$$\Rightarrow \frac{10}{3} \times 3 = X_b \times 4$$

$$\Rightarrow X_b = X_a = \frac{10}{3}$$

Sec m on Cantilever

Sec m

10 (x → y) R.H.S

10 (x → y) L.H.S

$$Q = -Y_b$$

$$Q_m = Y_b$$

$$Q_b = X_b$$

$$N_b = -Y_b$$

$$M_b = -X_b$$

$$N_m = -X_b$$

$$N_m = -X_a$$

$$M_m = 4 X_b$$

$$M_m = 6 Y_a + 4 X_a$$

